

CLAIMS

1. A tuning circuit comprising:
a voltage controlled oscillator for generating a first clock signal
comprising:
5 an inductive element;
a variable capacitive element coupled to the inductive element;
a bank of switched capacitors coupled to the inductive element and
the variable capacitive element;
a frequency divider for generating a second clock signal responsive to the
10 first clock signal an a predetermined divisor;
frequency control circuitry for controlling the variable capacitive element
responsive to a frequency difference between the first and second clock signals;
and
logic circuitry for:
15 determining an initial control word to configure the bank using a
search responsive to a desired frequency; and
determining whether the initial control word should either remain
the same or change to an adjacent control word.
2. The tuning circuit of claim 1 wherein said logic circuitry determines
20 an initial control word to configure the bank by using a search having an
accuracy that is greater than or equal to ± 1 least significant bit of the initial
control word.
3. The tuning circuit of claim 1 wherein the logic circuitry determines
whether the initial control word remains the same by comparing the desired
25 frequency to upper and lower bounds of a frequency range for the voltage
controlled oscillator while configured according to the initial control word.

4. The tuning circuit of claim 3 wherein the logic circuitry determines the initial control word using fast comparisons between an actual frequency and the desired frequency and determines whether the initial control word should remain the same by using more precise comparisons between the actual
5 frequency and the desired frequency.

5. The tuning circuit of claim 1 wherein the logic circuitry determines whether the initial control word remains the same by determining whether the difference between the desired frequency and an actual frequency for the voltage controlled oscillator while configured according to the initial control word is
10 within a predetermined threshold.

6. The tuning circuit of claim 5 wherein an indication of the actual frequency is determined by counting clock cycles from the voltage controlled oscillator in a frequency divider circuit.

7. A method of calibrating a voltage controlled oscillator having an
15 LC tank with an inductive element, a variable capacitive element coupled to the inductive element, and a bank of switched capacitors coupled to the inductive element and the variable capacitive element, comprising the steps of:

determining an initial control word to configure the bank using a search responsive to a desired frequency
20 enabling a set switched capacitors in the bank responsive to the initial control word;
comparing an output frequency from the voltage controlled oscillator with the desired frequency; and
determining whether the initial control word should either remain the
25 same or change to an adjacent control word.

8. The method of claim 1 wherein said step of determining an initial control word comprises the step of determining an initial control word to

configure the bank by using a search having an accuracy that is greater than or equal to ± 1 least significant bit of the initial control word.

9. The method of claim 7 wherein the step of determining whether the initial control word remains the same comprises the step of comparing the
5 desired frequency to upper and lower bounds of a frequency range for the voltage controlled oscillator while configured according to the initial control word.

10. The method of claim 9 wherein the step of determining the initial control word comprises the step of using fast comparisons between an actual
10 frequency and the desired frequency and wherein the step of determining whether the initial control word should remain the same comprises the step of using more precise comparisons between the actual frequency and the desired frequency.

11. The method of claim 7 wherein the step of determining whether the
15 initial control word remains the same comprises the step of determining whether the difference between the desired frequency and an actual frequency for the voltage controlled oscillator while configured according to the initial control word is within a predetermined threshold.

12. The method of claim 7 wherein the step of determining whether the
20 difference between the desired frequency and an actual frequency is within a predetermined threshold comprises the step of calculating an indication of the actual frequency by counting clock cycles from the voltage controlled oscillator in a frequency divider circuit.